

**Notice of Allowability**

Application No.

09/423,554

Applicant(s)

ARISTIDOU ET AL.

Examiner

Malgorzata A. Walicka

Art Unit

1652

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--**

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to 02/27/06.
2. ☒ The allowed claim(s) is/are 25,26,43,45,46,69-71 and 73.
3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some\* c) ☐ None of the:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\* Certified copies not received: \_\_\_\_\_.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
- (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
- 1) ☐ hereto or 2) ☐ to Paper No./Mail Date \_\_\_\_\_.
- (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date \_\_\_\_\_.

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

**Attachment(s)**

- |   |   |
|---|---|
| 1. <input type="checkbox"/> Notice of References Cited (PTO-892)  | 5. <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)           |
| 2. <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                | 6. <input type="checkbox"/> Interview Summary (PTO-413),<br>Paper No./Mail Date _____ |
| 3. <input type="checkbox"/> Information Disclosure Statements (PTO-1449 or PTO/SB/08),<br>Paper No./Mail Date _____ | 7. <input type="checkbox"/> Examiner's Amendment/Comment                              |
| 4. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit<br>of Biological Material          | 8. <input checked="" type="checkbox"/> Examiner's Statement of Reasons for Allowance  |
|   | 9. <input type="checkbox"/> Other _____   |

Art Unit: 1652

The Amendment after Final Action under 37 CFR 1.116 filed Feb. 27, 2006, comprising amendment to the claims and remarks, is acknowledged. Claims 1-24 and 27- 42, 44, 47-68 have been previously canceled; claim 72 has been currently canceled. Claims 43 and 73 have been amended. Claims 25, 26, 43, 45, 46, 69-71 and 73 are pending, and under examination.

### **Detailed Office Action**

#### **1. REJECTIONS**

##### ***1.1. 35 USC 112, second paragraph***

Claims 72 and 73 were rejected in the Final Office Action of November 30, 2006 (final action).

Rejection of claim 72 is moot because the claim has been canceled. Rejection of claim 73 is withdrawn, because the claim does not depend on claim 72 anymore.

##### ***1.2. 35 USC 112, first paragraph***

###### **1.2.1. Withdrawal of rejection for lack of written description**

Claim 43, 45, 46 and 69-71 are rejected in the final action as failing to comply with the written description requirement. This rejection is now withdrawn, because claim 43 has been amended.

###### **1.2.2. Withdrawal of rejection for scope of enablement**

Art Unit: 1652

Claims 43, 45, 46 and 69-71 were rejected in the final action, because the specification, while being enabling for transformants H1803 (*S. cerevisiae* + XR + XDH + XK + **GDH**), H1791 (*S. cerevisiae* + **mGDH**), H2195 (*S. cerevisiae* + XR + XDH + mME), H2222 (*S. cerevisiae* + XR + XDH + XK + **mME**) and H2369 (*S. pombe* + XR + XDH + **mME**) **that produce more ethanol** than their counterparts not comprising GDH or ME, does not reasonably provide enablement for any *Saccharomyces* or *Schizosaccharomyces* sp. transformed with NAD-dependent GDH or malic enzyme that after transformation produce more ethanol.

This rejection is now withdrawn because claim 43 has been amended.

Response to Applicants traverse

In their Remarks, page 6, line 12 and further, Applicants stress that the Examiner has mischaracterized the transformants.

"For instance, the Examiner refers to H1803 (see page 3, last line and page 6, second to last line of the outstanding Office Action) as including XR and XDH. However, as explained at pages 29-30, of the present specification, H1803 does not include XR or XDH. Similarly, the Examiner has also incorrectly asserted that H1791 includes XR and XDH. Moreover the Examiner has made similar mistakes with respect to the characterization of H2195 and H2222".

Applicants argument has been fully considered but is found not persuasive for the following reason. The transformants obtained by the Applicants include several consecutive transformations with different genes. Obtaining specific

Art Unit: 1652

transfromants is not clearly described in the specification and requires checking the consecutive transformations that can be taught in different places in the specification.

Of H1803, H1791, H2195 and H2222 only H1791 does not comprise XR and XH, but H1803, H2195 and H2222 do.

Strain H1803 is integrant H1469 (having integrated XR and XDH) which was further transfected with XK and NAD-GDH; see page 29, line 5 and further, and page 33 line 7-13. Thus, H1803 contains XR +XDH + XK and NAD - GDH.

Strain H2195 is integrant H1469 (having integrated XR and XDH) further transformed to contain ME; see page 21-30. Thus H2195 contains XR +XDH +ME.

Strain H2222 is integrant H1469 (having integrated XR and XDH) further transformed to contain XK and ME; see page 40 line 8-31 and page 43 line 21-30. Thus H2222 contains XR + XDH+XK + ME.

## 2. Allowance

Claims 25-26, 43, 45, 46, 69-71 and 73 are allowed. Claims 25-26 are directed to unique transformants of *S. cerevisiae* and *S. pombe* and these claims have been allowed for reasons stated in the first Office Action of July 17, 2001. Claims 43, 45-46, 69-71 and 73 are allowed as directed to a method for increasing yield of ethanol

Art Unit: 1652

production by fermentation of engineered cells belonging to *Saccharomyces* spp. and *Schizosaccharomyces* spp., including those of claims 25 and 26. The method uses the cell transformants that were engineered to be capable of growing on xylose, in addition to other pentoses, as well as to produce ethanol efficiently. Transfection with xylose reductase, xylitol dehydrogenase as well as xylulokinase genes ensures the growth on xylose. The increase in production of ethanol was achieved by additional transformation with glutamate dehydrogenase or malic enzyme gene. The closest prior art, WO 97/42307, published 13 November, 1997 (enclosed in the IDS of Nov. 10, 1999), teaches that *S. cerevisiae* transformed with xylose reductase, xylitol dehydrogenase and xylulokinase genes can produce ethanol when grown on xylose or glucose. However, the prior art does not teach or suggest that the production of ethanol can be increased by further transformation with a gene of NAD-dependent glutamate dehydrogenase or malic acid enzyme. Thus, the claims are allowed.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Malgorzata A. Walicka whose telephone number is (571) 272-0944. The examiner can normally be reached on Monday-Friday from 10:00 a.m. to 4:30 p.m.

Art Unit: 1652

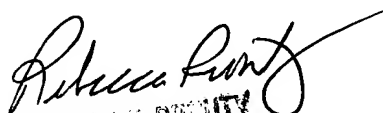

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ponnathapura Achutamurthy, can be reached on (571) 272-0928. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Malgorzata A. Walicka, Ph.D.

Art Unit 1652

Patent Examiner

  
REBECCA E. PRODY  
PRIMARY EXAMINER  
GROUP 1652  
1652  
  
PONNATHAPU ACHUTAMURTHY  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 1652